

Rapid and sustainable urbanization through Smart Cities

A. Concept of a smart city

A smart city is one that uses technology to make optimal utilization of resources to make cities more **efficient, sustainable and people-centric**. The basis of the smart city concept is that apart from physical infrastructure, soft infrastructure in the form of intellectual and social capital is critical for modern urban development. This is achievable through the use of technology, especially **information and communication technology (ICT)**.

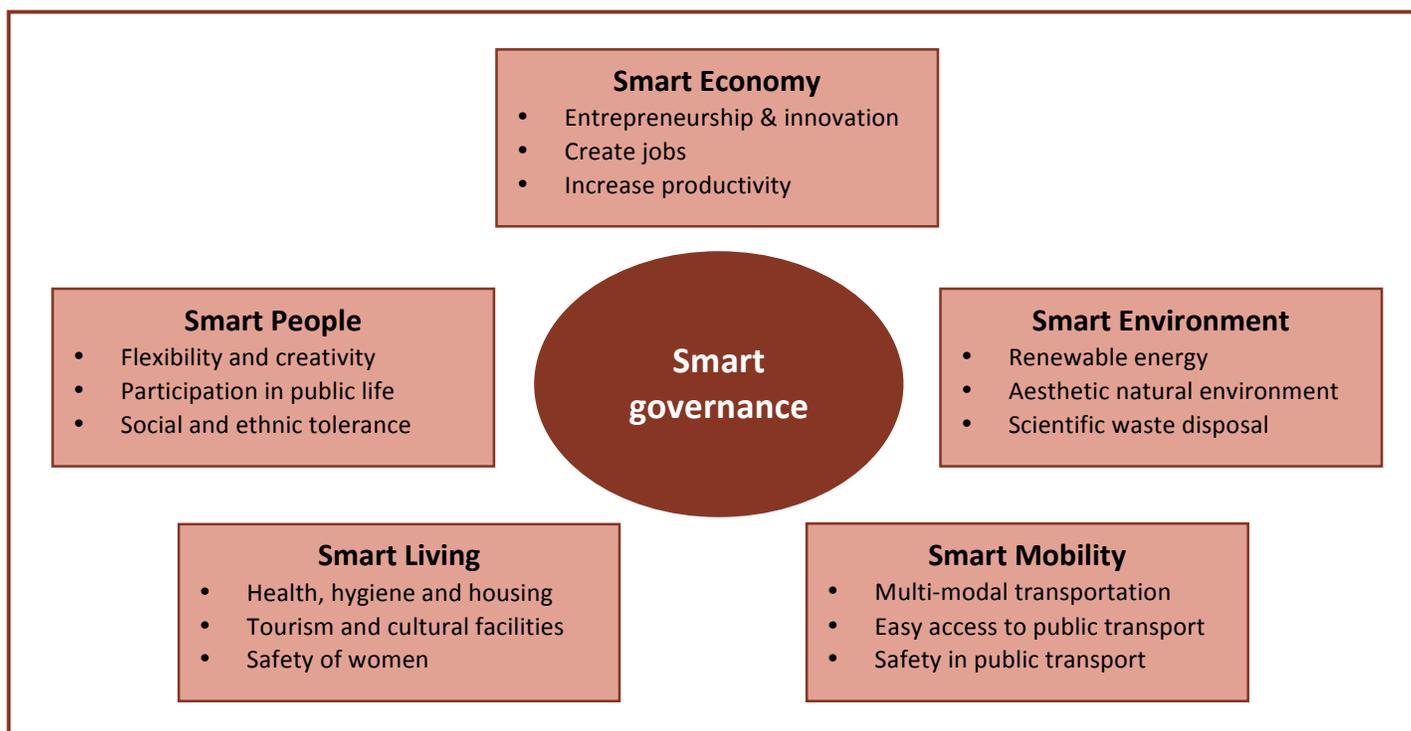
B. Need for smart cities

In the last two decades, urban infrastructure in many Indian cities has been upgraded. Modern airports, flyovers, bridges and expressways can be found in most big cities in the country. However, the quality of urban services has not kept pace with the population explosion in most of our major urban centres. Overcrowding has led to a space crunch, which is aggravated due to lack of efficient and scientific utilization of urban spaces. The growing urban population exerts unbearably high pressure on the environment which contributes to deterioration in the quality of lives of most citizens.

The next transformation in urban India would involve placing the concerns of citizens at the centre of any urbanization strategy – something which smart cities aim to achieve in the next few decades.

C. Features of a smart city

A smart city is characterized by smartness along multiple parameters, with **smart governance** playing a central role in enabling each of them. This is illustratively shown in the diagram below:



D. Approaches to developing Smart Cities

Broadly, two approaches can be adopted for developing smart cities –

- a) **brownfield approach** which involves *upgrading existing cities* to make them smarter.
- b) **greenfield approach** which involves *creating a new smart city* within or in the vicinity of an existing town or urban centre. This approach has been adopted on a small scale by some States in India, as described later in this report.

A combination of these approaches would have to be adopted for the holistic development of urban towns. A new model city (Greenfield) could be developed to **encourage manufacturing and create jobs**, while making existing towns smarter will lead to **better and more sustainable living conditions** for the growing urban population. Many pilot projects have been initiated in different cities of India to improve their habitability. However, these were not part of a comprehensive plan to develop smart cities in India. In the next few years, these initiatives need to be scaled up as part of the Smart City Plan. Such smart projects include:

1. **Waste-to-energy projects** – Conversion of solid waste into energy is a modern waste disposal method which serves 2 purposes. Firstly, it *reduces solid waste accumulation* in the form of landfills. Secondly, it *generates energy* which can be used for other purposes. The Pune Municipal Corporation has implemented this project already.
2. **Intelligent bus transport systems** – Mysore was the first city to implement a dynamic *passenger information system* (PIS) available on public displays at bus stops, bus terminals and the internet. This allows passengers to plan their travel in advance, and encourages them to use public transport over private vehicles. The system is backed by *GPS-enabled navigation systems* and supported by an ICT network which allows the driver and the central control station to be in constant touch.
3. **Renewable energy** – The use of solar power to meet energy needs has the potential to make cities cleaner and greener, while meeting energy needs of the rapidly growing urban population. In greenfield (new) urban projects, renewable energy such as solar and wind energy could ensure uninterrupted power supply for industries and other establishments in the city. This can boost manufacturing and economic growth.

E. Policy framework

The ambition of smart cities can be realized only if an enabling policy framework is in place. This would involve effective coordination between Central and State governments and an improvement in the state of urban local bodies (ULBs). Some of the major elements of such a policy framework would include:

1. **Public-private partnership** – Since smart cities depend critically on technology, the expertise and efficiency of the private sector are important. PPP projects could be initiated in waste management, public transport and tourism development. Different types of PPP models can be explored based on the requirement and other technical and financial considerations.
2. **Peoples' participation** – The success of the smart city concept is not possible without people's direct participation. Community involvement could expedite land clearances. It could also help to better understand problems of health, hygiene and sanitation in a particular area, and evolve cheap and innovative approaches to such problems. Water is a scarce resource, especially in urban areas, and its efficient utilization of water is also possible only through greater community involvement. Finally the complex yet crucial task of rejuvenation of rivers in our cities can be achieved through local citizens' participation.
3. **Urban governance** – As pointed out earlier, smart governance is central to the concept of a smart city. Many urban local bodies (ULBs) in India have been getting smarter through the use of ICT in their services. The *integration of multiple municipal services* on a single user interface can improve their efficiency and make them more easily accessible to citizens. In Maharashtra, the Pimpri-Chinchwad Municipal Corporation (PCMC) has already adopted such a model. However, it is important to improve the financial health of ULBs to make this a success.

4. **Holistic planning** – As observed earlier, many pilot projects have been initiated by State governments and local bodies for urban development through the use of technology. But these projects have not been part of any holistic Smart

City Plan. A holistic plan for the use of technology would lead to better utilization of scarce resources and more effective allocation of resources to different parts of the city. *The process of planning itself should also use technology such as GIS-based mapping of cities.*

These policy initiatives can be encouraged by providing suitable incentives to the private sector, citizen stakeholders and the urban local bodies (ULBs)

F. Smart City Projects in different parts of the world

Montpellier, France

Montpellier in southern France is the fastest growing city in the country. The Montpellier metropolitan area is in the early stages of a \$5.2 million research and development project funded by the local government. The objective of this programme is to transform Montpellier into a sustainable city which uses clean technology. With the help of multi-national technology firm IBM, the city authorities are collecting data from various sectors, such as public transportation and water management. Montpellier has also created a contest for small and midsize companies to provide a proposal for taking the real-time data and creating new uses for it, thus empowering stakeholders and ensuring their participation. The city administration's efforts have resulted in a 10 percent improvement in water yield; future goals of the city are to reduce flooding by 20 percent and reduce automobile traffic by 10 percent.

Masdar City

Masdar city is located 17 Km east of Abu Dhabi in the United Arab Emirates (UAE). It is spread over an area of 6 km and is owned by Mubadla Development Company (an Abu Dhabi government vehicle). The construction of Masdar City started in 2008 and is expected to be completed sometime in between 2020 and 2025. The cost of the city is expected to be upwards of \$19 billion. When completed, the city will provide residence to 40,000 people with another 50,000 commuting to the city for work.

Masdar City will be mostly powered by solar energy and public transport will include travel pods running on magnetic tracks. The city has been designed keeping the local climatic conditions in mind. The focus on constructing high-rise buildings ensures that streets get only 30-45 minutes of direct sunlight a day in the desert climate, contributing to natural cooling mechanism of the city, temperatures in Masdar City are reportedly 10-15 degrees lower than in rest of Abu Dhabi. The buildings are constructed at least one story off the ground in order to harness the natural breeze and circulate it through the building structures. In the process of creating such high rise buildings the city has also created a shaded public space at street level with expansive views out over the rest of the site.

Songdo, Republic of Korea

Songdo International Business District (SIBD) in Republic of Korea is a smart city built on 1,500 acres of reclaimed land. The city is located 65 Km southwest of the Korean capital of Seoul. Construction of this \$35 billion project began in 2004 and it is expected to be completed by 2017. On completion it is likely to become Korea's premier international business district and one of Asia's largest green business districts. By 2017, 65,000 residents are expected to live in the city. Three lakh people are expected to commute to the city for work every day.

The city is planned to contain 80,000 apartments, 50,000,000 square feet of office space and 10,000,000 square feet of retail space. SIBD is being developed as a sustainable city with more than 40% of its area reserved for green space, including the park of 100 acres (0.40 km²), 16 miles (26 km) of bicycling lanes, numerous charging stations for electric vehicles and a waste collection system that eliminates the need for trash trucks. A sleek public transport system including underground trains linked to Seoul and a network of electric water taxis in the city's salt-water canals will help make this one of the cleanest urban areas in the world.

G. Greenfield Smart City projects in India

GIFT City, Gujarat

The Gujarat International Financial Tec (GIFT) City is conceptualized as a global financial and Information and Technology (IT) services hub, a first of its kind in India. It is being setup to provide a technologically advanced financial services gateway to national and world financial markets. GIFT city is modelled as an efficient and sustainable city. The Rs. 70,000 crore project is being developed through a Public Private Partnership between the Gujarat Urban Development Company Limited and IL&FS. The construction of the city started in 2011, with the first two towers being completed in 2014. The city is spread over 886 acres of land and on completion in 2022 will be hub for 10 lakh direct and indirect jobs.

GIFT City is accessible from NH-8 (Delhi to Mumbai) and railway line passes by the site on the west (to Delhi) and east (to Himmatnagar). The distances from Gandhinagar and Ahmedabad Core City are 8 kms and 12 kms respectively.

The city is planned to harness non- conventional sources of energy such as solar water heating, rain water harvesting. A 12-km long maze of utility tunnels is being dug under the city scape, through which power cables, fibre optic cables, water pipelines will be routed. The city will have automated waste collection system (AWS) to ensure minimum human intervention in waste treatment and District Cooling Centres for cutting energy cost by employing environment- friendly methods for cooling technology.

Kochi Smart City

Kochi SmartCity will be promoted by the Dubai based company "SmartCity" and the government of Kerala. Dubai based "SmartCity" is a joint venture company promoted by TECOM Investments and SAMA Dubai, backed by the Dubai government. Smart City will be an exclusive IT zone where companies can easily set up offices without any stringent formalities of registration and licensing. It will include office space, residences, schools, shopping complex, parks, entertainment complex etc.

Delhi- Mumbai Industrial Corridor

Following the Government of India and Government of Japan memorandum of understanding (MoU) signed in 2006, the Government of India accorded in-principle approval to the Delhi Mumbai Industrial Corridor (DMIC) Project in 2007.

This Dedicated Freight Corridor between Delhi and Mumbai, will cover an overall length of 1,483 Km and pass through the states of Gujarat, Haryana, Maharashtra, Rajasthan, NCR of Delhi and Uttar Pradesh. During 12th Five Year Plan (2012-2017), an amount of Rs.7,546 crore has been allocated for DMIC Project. The corridor will have its end terminals at Dadri (Uttar Pradesh) and Jawaharlal Nehru Port near Mumbai (Maharashtra).

DMIC aims to double employment potential of smart cities located on its route in 7 years, triple industrial output in 9 years, quadruple exports from the region in 8-9 years and create a "knowledge based ecosystem" integrated with industries leading to innovation and economic development.

Seven new smart cities are being developed from scratch along the proposed Delhi-Mumbai Industrial Corridor (DMIC).

¹These regions are proposed to be self-sustained industrial townships with world-class infrastructure, road and rail connectivity for freight movement to and from ports and logistics hubs, served by domestic/ international air connectivity, reliable power and other quality social infrastructure, and provide a globally competitive environment conducive for setting up businesses. Industrial Area (IA) would be developed with a minimum area of over 100 square kilometers (10,000 hectares).



Phase 1 of DMIC will cover the following Industrial Regions:

1. Dadri-Noida-Ghaziabad Investment Region in Uttar Pradesh as General Manufacturing Investment Region;
2. Manesar-Bawal Investment Region in Haryana as Auto Component/ Automobile Investment Region;
3. Khushkhera-Bhiwadi-Neemrana Investment Region in Rajasthan as General Manufacturing/ Automobile/ Auto Component Investment Region;
4. Pitampur-Dhar-Mhow Investment Region in Madhya Pradesh as General Manufacturing Investment Region;
5. Bharuch-Dahej Investment Region in Gujarat as Petroleum, Chemical and Petro-Chemical Investment Region (PCPIR);
6. Gatpuri-Nashik-Sinnar Investment Region in Maharashtra as General Manufacturing Investment Region;
7. Ahmadabad - Dholera Investment Region in Gujarat as a mega industrial park;

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